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Research Article

New records of caddisflies (Insecta, Trichoptera) fauna in Kazakhstan*

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Abstract

Data on the new records of 14 species from 7 families of caddisflies from 12 places in southern, southeastern and northern Kazakhstan are given. Hydropsychidae: *Hydronema persica* Martynov, 1914, *Hydropsyche carbonaria* McLachlan, 1875, *Hydropsyche demavenda* Malicky, 1977; Hydrobiosidae: *Apsilochorema turanicum* Martynov, 1924; Hydroptilidae: *Hydroptila* sp. aff. *desertorum* Mey, 1993, *Hydroptila sanghala* Schmid, 1960; Leptoceridae: *Setodes* sp. aff. *punctatus* (Fabricius, 1793), *Parasetodus respersella* (Rambur, 1842); Apataniidae: *Apataniana cornuta*, **ssp. nov.**, *Apataniana* **sp. nov.**; Phryganeidae: *Agrypnia varia* (Fabricius, 1793); Limnephilidae: *Limnephilus martynovi* Kumanski 1994, *Limnephilus major* Martynov, 1909, *Philarctus bergrothi* McLachlan, 1880. The family Hydrobiosidae is the new for Kazakhstan. Currently 169 species of 66 genera of 18 families are known from Kazakhstan.

Key Words

New findings, southern, southeastern and northern Kazakhstan, Trichoptera

Introduction

Kazakhstan is the 9th largest country in the world. The territory of Kazakhstan features mountains, steppes, forests, and deserts; the most widespread landscapes are deserts and steppes. Water covers only 1.5% of the area. Nevertheless, Kazakhstan's territory counts over 8.5 thousand small and large rivers, and 48 thousand large and small lakes.

The unique geographical position of Kazakhstan in the center of the Eurasian continent, and the wide variety of landscapes and water bodies provide conditions for the formation of a diverse fauna of caddisflies. At the same time, the history of this region with periods of glaciation and desiccation affected the formation of the caddis fauna. The Kazakhstan territory borders three zoogeographic provinces according to division by de Moor and Ivanov (2008).

The history of the study of caddisflies in Kazakhstan began with the works of A.V. Martynov (1910, 1914, 1927a, 1927b) at the beginning of the 20th century. In 2016, a summary of the Kazakhstan fauna of caddisflies was made according to the literature data (Smirnova et al. 2016). The project "Assessment of the biodiversity of caddisflies (Trichoptera) in water bodies of Kazakhstan" was implemented in 2015–2017 to obtain missing information about the fauna, the distribution and occurrence of caddisflies, and to preserve their diversity. During this project, a Kazakh-Russian expedition to the north-east of the country took place. As a result, the list of caddis fauna of Kazakhstan was replenished with 13 species (Smirnova et al. 2016, 2020; Sklyarova et al. 2018; Sklyarova et al. 2019). More samples consistently add new species to the fauna of Kazakhstan; for example, out of four species collected in western Kazakhstan in spring, two species were new records (Melnitsky et al. 2018).

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Some earlier records of caddisfly species are considered doubtful due to their distribution and ecology. For example, in Oláh (2010), the species *Goera japonica* Banks, 1906, *Lepidostoma itoae* (Kumanski & Weaver, 1992), *Plectrocnemia wui* (Ulmer, 1932), *Tinodes furcatus* Li & Morse, 1997, *Molanna moesta* Banks, 1906, and *Wormaldia niiensis* Kobayashi, 1985 were recorded for the middle reaches of the Ile River. These species are distributed in southern China, Korea, Japan, and Far East of Russia in wet forests. We repeatedly collected caddisflies in the middle reaches of the Ile River from 2015 to 2020 from June to September right in the times and places indicated for these species and failed to collect them. Subsequently they were excluded from the list of Kazakhstan caddisflies (Sklyarova et al. 2019). Currently, studies of caddisflies are carried out on a voluntary basis by scientists from various institutions in Kazakhstan, Russia, and Finland.

In this study we present an updated list of new records of caddisflies.

Methods

Field collections were accomplished with the well-known methods of light trapping with small water-filled UV pan traps installed close to aquatic habitats, generator-driven multi-lamp tents, net sweeping during the daytime in the riparian vegetation, and hand-picking of insects. All sampled caddisflies are stored in 70% ethanol.

Localities

Most of the new records were found in the southeast of Kazakhstan and only a few in the northern and southern parts of the country (Fig. 1).

Locality 1. Southeast Kazakhstan, Temirlik River; 43°21.521'N, 79°9.993'E, 970 m a.s.l., 2.–3.vii.2019, leg. J. Salokannel, D. Smirnova. A small river flowing in a canyon among the arid hills (Fig. 2A).

Locality 2. Southeast Kazakhstan, Chilik River, village Saty; 43°04.363'N, 78°25.615'E, 1425 m a.s.l., 29.–30.vii.2019, leg. J. Salokannel, D. Smirnova. The largest mountain river of the Trans-Ili Alatau, flowing in a wide valley (Fig. 2B).

Locality 3. Southeast Kazakhstan, Chilik River, above the Bartogay Reservoir 43°19.106'N, 78°30.819'E, 1070 m a.s.l., 04.vii.2019, leg. J. Salokannel, D. Smirnova. The Chilik River emerges from the gorge into a valley (Fig. 2C).

Locality 4. Southeast Kazakhstan, Borohudzir River, village Koktal-Arasan, 44°19.083'N, 79°48.6'E, 995 m a.s.l., 11.vii.2019, leg. V. Ivanov, S. Melnitsky, D. Smirnova. A small mountain river, a tributary of the Ile river (Fig. 2D).

Locality 5. Southeast Kazakhstan, Karkara River, 42°49.235'N, 79°12.758'E, 1967 m a.s.l., 06.vi.2023, leg. A. Linnik. The mountain river at the sampling site flows through a wide valley, actively used for grazing livestock (Fig. 2E).

Figure 1. Sample localities in Kazakhstan.

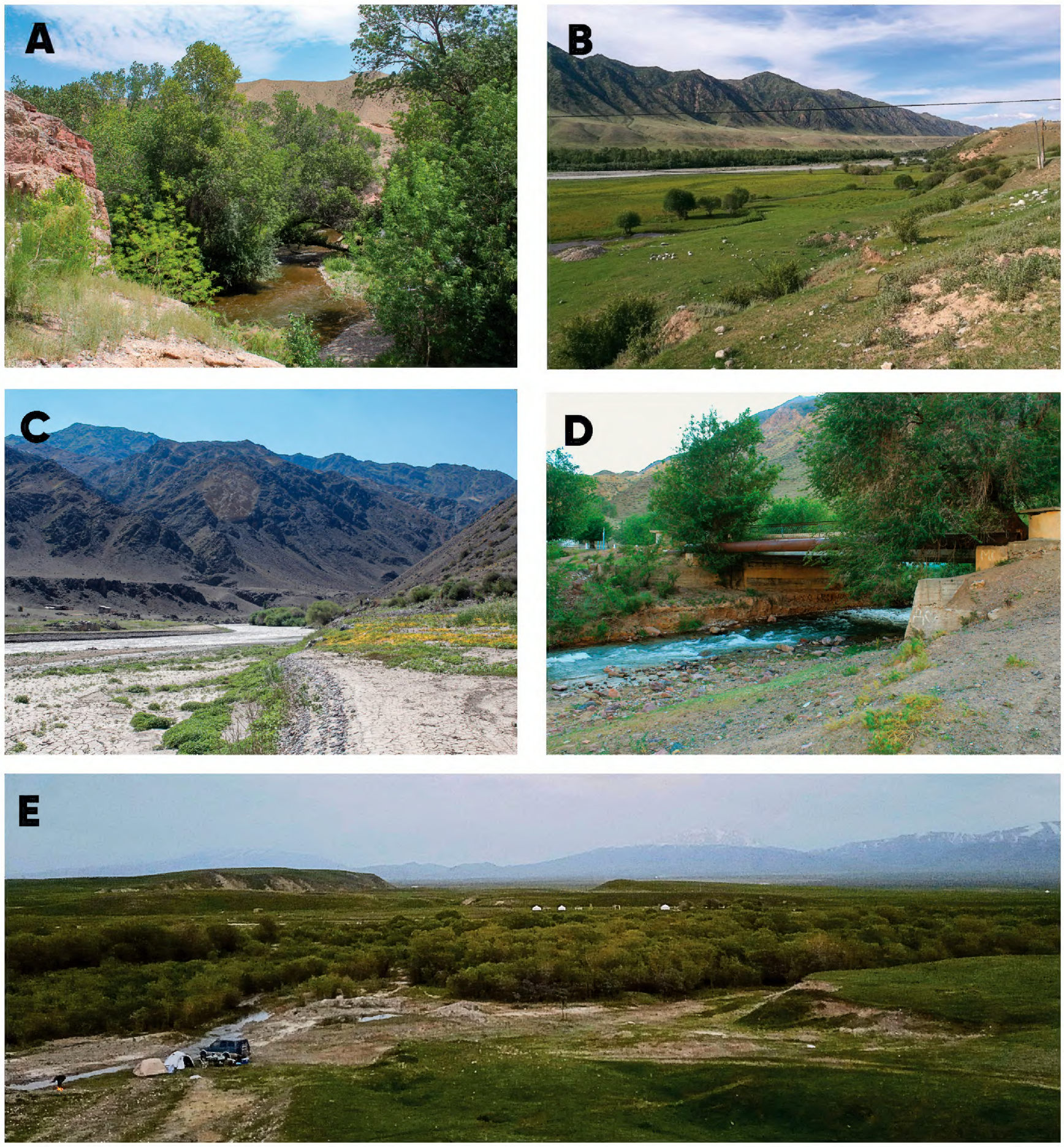

Figure 2. Biotopes of the localities: **A.** Temirlik River (Loc. 1); **B.** Chilik River, village Saty (Loc.2); **C.** Chilik River, above the Bartogay Reservoir (Loc.3); **D.** Borohudzir River, village Koktal-Arasan (Loc.4); **E.** Karkara River (Loc.5). Photo: **A, C, D.** D. Smirnova; **B.** J. Salokannel; **E.** A. Linnik.

Locality 6. Southeast Kazakhstan, IIe River, Malaisary Pass area, 44°28.717'N, 76°41.267'E, 1140 m a.s.l., 07.vii.2022, leg. J. Epova. One of the largest rivers in Kazakhstan. At the sampling site, the river flows in a semi-desert wide hilly valley with gallery "tugai" vegetation along shores (Fig. 3A).

Locality 7. Southeast Kazakhstan, 32 km N Zharkent, spring near river Nizhnyaya Taldy, 44°26.25'N, 79°52.65'E, 1338 m a.s.l., 21.viii.2017, leg. S. Melnitsky, V. Ivanov, D. Smirnova. A very small rocky spring in the basin of the mountain river Usek (Fig. 3B).

Locality 8. Southeast Kazakhstan, Turgen Gorge, 43°13.092'N, 77°51.067'E, 2340 m a.s.l., 22.vii.2017, leg. T. Dujsebayeva, T. Egorova. The spring, which turns into a small stream with swampy banks, is located in the forest zone (Fig. 3C).

Locality 9. South Kazakhstan, Ugam River, 41°55.267'N, 70°03.75'E, 1201 m a.s.l., 18.vii.2019, leg. S. Melnitsky, V. Ivanov. The mountain river, tributary of the Chirchik River (Syrdarya Basin) (Fig. 3D).

Locality 10. North Kazakhstan, Lake Kushmurun, 52°32.34'N, 64°44.52'E, 130 m a.s.l., 06–07.viii.2018, 09.viii.2018, leg. J. Salokannel. A brackish lake in the steppe zone (Fig. 3E).

Locality 11. North Kazakhstan, lake Karasu, 52°37.74'N, 65°32.28'E, 200 m a.s.l., 08.viii.2018, leg. J. Salokannel. A brakish lake in the steppe zone.

Locality 12. South Kazakhstan, 23 km E from Kentau, Karatau Mountains, Uyuk River, 43°29.833'N, 68°51.133'E, 624 m a.s.l., 21.vii.2019, leg. S. Melnitsky, V. Ivanov. A small fast flowing river in deep canyon (Fig. 3F).

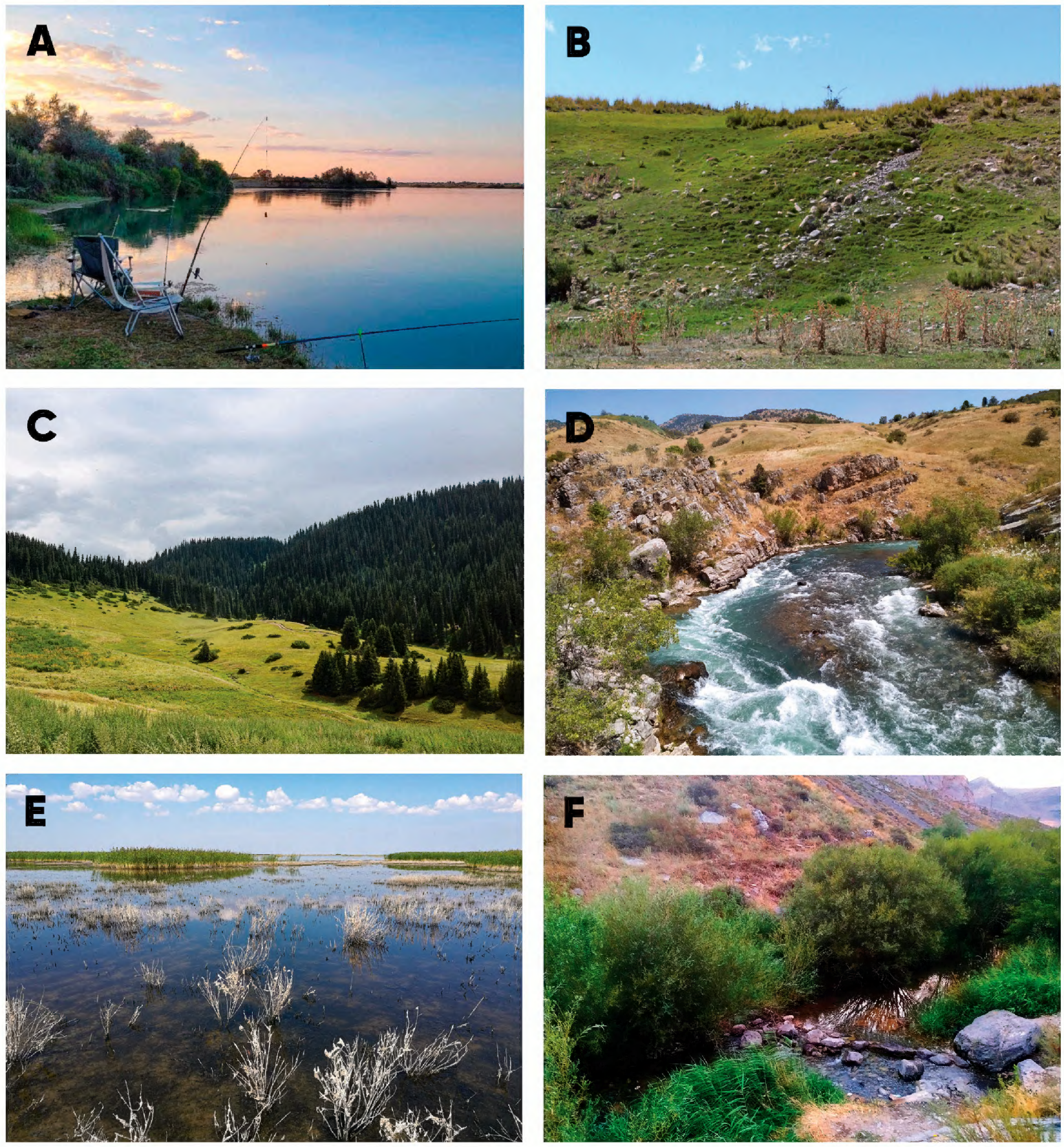

Figure 3. Biotopes of the localities: **A.** Ile River, Malaisary Pass area (Loc. 6); **B.** Spring near river Nizhnyaya Taldy (Loc.7); **C.** Turgen Gorge (Loc.8); **D.** Ugam River (Loc.9); 3E, lake Kushmurun (Loc.10); **F.** Uyuk, a small river in Karatau Mountains (Loc. 12). Photo: **A.** J. Epova; **B.** D. Smirnova; **C.** T. Egorova; **D.** S. Melnitsky; **E.** J. Salokannel; **F.** V. Ivanov.

Results

The following 14 species were recorded for the first time in Kazakhstan:

Hydropsychidae
Hydronema persica Martynov, 1914, localities 1, 2, 3, 9.
Hydropsyche carbonaria McLachlan, 1875, localities 1, 4, 5.
Hydropsyche demavenda Malicky, 1977, localities 1, 9.

Hydrobiosidae
Apsilochorema turanicum Martynov, 1934, locality 12.

Hydroptilidae
Hydroptila sp. *aff. desertorum* Mey, 1993, locality 1.
Hydroptila sanghala Schmid, 1960, locality 2.

Leptoceridae
Setodes sp. *aff. punctatus* (Fabricius, 1793), locality 6.
Parasetodes respersella (Rambur, 1842), locality 1.

Phryganeidae
Agrypnia varia (Fabricius, 1793), localities 10, 11.

Apataniidae
Apataniana cornuta, ssp. nov., locality 7.
Apataniana sp. nov., locality 8.

Limnephilidae
Limnephilus martynovi Kumanski, 1994, locality 1.
Limnephilus major Martynov, 1909, locality 1.
Philarctus bergrothi McLachlan, 1880, localities 10, 11.

Discussion

Ongoing studies of caddisflies in Kazakhstan confirmed the lack of knowledge about the species composition and distribution of species across the area. Most of the new findings are species previously found in the surrounding areas.

Such species as *Hydronema persica*, *Hydropsyche carbonaria*, and *H. demavenda* have previously been discovered in nearby Central Asian countries – Uzbekistan, Kyrgyzstan and others (Morse 2024). These species inhabit various mountain streams. The dispersal of these species in the south and southeast of Kazakhstan is also expected. The new findings extend their previously known distribution areas eastwards. We consider here *Apsilochorema turanicum* Martynov, 1934 as an independent species, not as a subspecies of *A. indicum* (Ulmer, 1905) because of distinct differences in the male genital structures, especially inferior appendages compatible to the differences of other species in the genus *Apsilochorema*. *A. turanicum* was described by A.V. Martynov from the Samarkand area in Uzbekistan (Martynov 1934), some 400 km southwards the Karatau Mountains (Loc. 12).

Hydroptila sanghala and *H. desertorum* are known in the Xinjiang Uygur Autonomous Region of China, bordering Kazakhstan (Morse 2024). Thus, the finding of *H. sanghala* in southeastern Kazakhstan was quite expected. The specimens of *Hydroptila* sp. aff. *desertorum* may be either a variation of *H. desertorum* or a species closely related to it.

The species *Setodes punctatus* and *Limnephilus major* occur in Europe; they also were found in Siberia, the Far East, and northeast China (Morse 2024). The habitats of these species in Kazakhstan are not so obvious. *Parasetodes respersella* is a widespread but infrequent species occurring in Southern Europe and in various Asiatic localities (Malicky 2006; Morse 2024).

Both *Agrypnia varia* and *Philarctus bergrothi* live in stagnant waters, including brackish ones. *A. varia* is widespread but local in the western and eastern Palearctic (Morse 2024). Thus, their occurrence in the brackish lakes of northern Kazakhstan was not a surprise. *P. bergrothi* is a rare species, collected also in the Pamir highlands.

The record of *L. martynovi* in Temirlik River was unexpected. This species has until now been known only from the type locality in Yakutia.

The species *Apataniana cornuta* is common in brooks and springs throughout the mountain foothills of the Eastern Kazakhstan from Ile to Irtysh river valleys. Our samples contain a new mountain subspecies with its genitalia as in the original description (Ivanov 1991), but the adults have differences in coloration and ecology.

All these new findings were made in summer; therefore, future records made in previous and new sampling sites in other seasons of the year might bring more species that are new for the Kazakhstan fauna. The current list with addition of new findings counts 169 species in 66 genera of 18 families known from Kazakhstan. Continuing studies are expected to add more entries to this list.

References

Malicky H (2006) Beiträge zur Kenntnis asiatischer Leptoceridae (Trichoptera: Adicella, Athripsodes, Ceraclea, Leptocerus, Oecetis, Parasetodes, Tagalopsyche, Triaenodes, Trichosetodes). Linzer biologische Beiträge 38/2: 1507–1530.

Martynov AV (1910) Les Trichoptères de la Sibérie et des regions adjacentes, II. Annuaire du Musee zoologique del'Academie imperiale de St. Pétersbourg 15: 351–429. [in Russian with English descriptions of new species]

Martynov AV (1914) Die Trichopteren Sibiriens und der angrenzenden Gebiete. III. Teil. Subf. Apataniinae (Fam.Limnophilidae). Annuaire du Musée Zoologique de I'Académie des Sciences de I'URSS 19(1): 1–87.

Martynov AV (1927a) Contributions to the aquatic entomofauna of Turkestan. I. Trichoptera Annulipalpia. Annuaire duMusée Zoologique de l'URSS 28: 162–193.

Martynov AV (1927b) Contributions to the aquatic entomofauna of Turkestan. II. Trichoptera Integripalpia, with a note on a new species of Rhyacophila. Annuaire du Musée Zoologique de l'URSS 28: 457–495.

Martynov AV (1934) Caddisflies. 1. Trichoptera–Annulipalpia (Keys to the Fauna of the USSR, Issue 13). Academy of Sciences of the USSR, Leningrad, 384 pp. [in Russian]

Melnitsky SI, Ivanov VD, Smirnova DA (2018) A small collection of caddisflies (Insecta:Trichoptera) from western Kazakhstan. Braueria 45: 31–32.

de Moor FC, Ivanov VD (2008) Global diversity of caddis flies (Trichoptera: Insecta) in freshwater. Hydrobiologia 595: 393–407. https://doi.org/10.1007/s10750-007-9113-2

Morse J [Ed.] (2024) Trichoptera World Checklist. https://trichopt.app.clemson.edu/ [Last checked February 7, 2024]

Oláh J (2010) New species and new records of Palaearctic Trichoptera in the material of the Hungarian natural History Museum. Annales Historico-naturales Musei nationalis Hungarici 102: 65–117.

Sklyarova ON, Kraynyuk VH, Smirnova DA (2018) Caddis flies fauna (Trichoptera, Insecta) of Central and North Kazakhstan.Vestnik Kazakhskogo Nacz. Univ. imeni Al-Farabi. Seriya biologicheskaya. Razdel 2. Zoologiya 3(76): 14–26. https://doi.org/10.26577/EB-2018-3-1337 [in Russian]

Sklyarova ON, Epova YUV, Smirnova DA, Ivanov VD (2019) Caddisflies (Insecta: Trichoptera) of Ili river (Kazakhstan). In: Cherchesova SK (Ed.) Problemy vodnoj entomologii Rossii i sopredelnykh territorij: Materialy VII Vserossijskogo (s mezhdunarodnym uchastiem) nauchnogo simpoziuma po amfibioticheskim i vodnym nasekomym; Sev.-Oset. gos. un-t im. K. L. Hetagurova. IPCz SOGU,Vladikavkaz, 132–137. [in Russian]

Smirnova DA, Ivanov VD, Melnitsky SI, Sklyarova ON, Epova JV (2020) Trichoptera of Saur and Tarbagatay Mountains (Kazakhstan). Zoosymposia 18: 063–071. https://doi.org/10.11646/zoosymposia.18.1.10

Smirnova D, Kushnikova L, Evseeva A, Grishaeva O, Kraynyuk V, Pilin D, Sklyarova O, Epova Y, Baymukanova Z, Timirkhanov S (2016) The Trichoptera of Kazakhstan: A review. Zoosymposia 10: 398–408. https://doi.org/10.11646/zoosymposia.10.1.36